

In the Claims:

Please amend the amended claims attached to the published International Preliminary Report On Patentability as follows:

1. (currently amended) A hydraulic ~~subsea~~ coupling device, comprising:

a male coupling part (20) in the form of a sealing element comprising a hollow body (26) of metallic material with a first male sealing member (21a) formed at a first end of the body (26) and a second male sealing member (21b) formed at a second end of the body (26) opposite said first end;

a first female coupling part (40) provided with a first female sealing member (41) and having an internal bore (42) extending through the coupling part (40) and its female sealing member (41); and

a second female coupling part (30) provided with a second female sealing member (31),  
~~characterized in:~~

~~that~~ wherein the first male sealing member (21a) has an external spherical contact surface (23a) designed for mating with a corresponding internal conical contact surface (43) of the first female sealing member (41) so as to form a fluid-tight seal between the first male sealing member and the first female sealing member when their contact surfaces are pressed against each other;

~~that~~ wherein the second male sealing member (21b) has an external spherical contact surface (23b) designed for mating with a corresponding internal conical contact surface (33) of the second female sealing member (31) so as to form a fluid-tight seal between the second male

sealing member and the second female sealing member when their contact surfaces are pressed against each other;

~~that~~ wherein the body (26) is provided with an intermediate member (24), which forms a continuous part together with the first and second male sealing members (21a, 21b) and which is mechanically compressible so as to be capable to store elastic energy when the body (26) is subjected to axial compression; and

~~that~~ wherein an internal bore (22) extends through the body (26) and through the first and second male sealing members (21a, 21b) and the intermediate member (24), the spherical contact surface (23a, 23b) of the respective male sealing member (21a, 21b) surrounding said internal bore (22).

2. (currently amended) A The hydraulic ~~subsea~~ coupling device according to claim 1, ~~characterized in that~~ wherein the first male sealing member (21a) is coaxial with the second male sealing member (21b).

3. (currently amended) A The hydraulic ~~subsea~~ coupling device according to claim 1 or 2, ~~characterized in that~~ 1, wherein the intermediate member (24) is expandable by an internal fluid pressure in the body (26) so as to urge the respective male sealing member (21a, 21b) outwards in the axial direction of the body (26) against the corresponding female sealing member when the sealing element is fitted between said female sealing members, thereby increasing the sealing contact pressure between the respective male sealing member and the corresponding female sealing member.

4. (currently amended) A The hydraulic subsea coupling device according to claim 3, ~~characterized in that~~ wherein the intermediate member (24) has an internal cross-sectional area which is larger than the external cross-sectional area of the respective male sealing member (21a, 21b) as seen at the point (P) of the male sealing member where the male sealing member is designed to engage with the corresponding female sealing member.

5. (currently amended) A The hydraulic subsea coupling device according to ~~any one of claims 1-4,~~ claim 1, wherein the intermediate member (24) is essentially shaped as a single or multiple wave bellows.

6. (currently amended) A The hydraulic subsea coupling device according to ~~any one of claims 1-5,~~ claim 1, wherein the second female coupling part (30) has an internal bore (32) extending through the coupling part (30) and its female sealing member (31).

7. (currently amended) A The hydraulic subsea coupling device according to ~~any one of claims 1-5,~~ claim 1, wherein the second female coupling part (30) is designed as a stop member adapted to close the internal bore (22) of the male coupling part (20) when the male coupling part is clamped between the first and second female coupling parts (10, 30).

8. (currently amended) A The hydraulic subsea coupling device according to ~~any one of claims 1-7,~~ claim 1, wherein:

~~that~~ at least one of the first and second female coupling parts (10, 30) is provided with a

valve (40), which comprises a valve body (41) displaceably arranged inside the internal bore (12, 32) of the female coupling part and a spring member (42) acting on the valve body, the valve body being displaceable against the action of the spring member (42) from a first position, in which the valve is closed and prevents fluid flow through the internal bore (12, 32) of the female coupling part, to a second position, in which the valve is open and allows fluid flow through the internal bore of the female coupling part; and

~~that~~ the male coupling part (20) is provided with an actuation member (25) for displacing the valve body (41) from said first position to said second position immediately before the female sealing member (11, 31) of the female coupling part (10, 30) is brought into engagement with the corresponding male sealing member (21a, 21b) of the male coupling part (20).

9. (currently amended) A The hydraulic ~~subsea~~ coupling device according to claim 8, ~~characterized in wherein~~:

~~that~~ the valve (40) comprises a housing (43) which is immovably fixed inside the internal bore (12, 32) of the female coupling part (10, 30), said housing being provided with a cavity (44) accommodating the spring member (42) and a part of the valve body (41); and

~~that~~ wherein said cavity (44) is in fluid communication with an orifice (45) at the end of the valve facing the free end of the female sealing member (11, 31) of the female coupling part (10, 30) so as to allow the cavity to be in fluid communication with the surroundings via said orifice (45) when the female coupling part (10, 30) is out of engagement with the male coupling part (20).

10. (currently amended) A The hydraulic ~~subsea~~ coupling device according to claim 9,

~~characterized in that~~ wherein the actuation member (25) is adapted to restrict the flow through the orifice (45) when the female sealing member (11, 31) is in engagement with the corresponding male sealing member (21a, 21b).

11. (currently amended) A The hydraulic subsea coupling device according to claim 9 ~~or 10, characterized in that~~ 9, wherein the cavity (44) is in fluid communication with the orifice (45) via a channel (46) extending through the valve body (41).

12. (currently amended) A The hydraulic subsea coupling device according to claim 11, ~~characterized in that~~ wherein said channel (46) extends axially through the valve body (41).

13. (currently amended) A The hydraulic subsea coupling device according to claim 11 ~~or 12, characterized in that~~ 11, wherein the actuation member (25) is adapted to engage with the valve body (41) so as to cover the orifice (45) and thereby restrict the flow through the orifice when the female sealing member (11, 31) is in engagement with the corresponding male sealing member (21a, 21b).

14. (currently amended) A The hydraulic subsea coupling device according to ~~any one of claims 8-13, characterized in~~ claim 8, wherein:

~~that~~ the valve (40) is provided with a ring-shaped seal element (47) arranged in an annular groove (48), which groove is provided in the inner wall (49) of the internal bore (12, 32) of the female coupling part; and

~~that~~ an external surface (50) of the valve body is adapted to engage with the ring-shaped

seal element (47) so as to form a fluid-tight seal between the inner wall (49) of the internal bore (12, 32) and the valve body (41) when the valve body is in said first position.

15. (currently amended) A The hydraulic subsea coupling device according to ~~any one of claims 8-14, characterized in claim 8, wherein:~~

~~that~~ the valve body (41) comprises a first body part (41a) and a second body part (41b), said first body part (41a) being located in front of the second body part (41b) as seen in a direction along the associated internal bore (12, 32) towards the associated female sealing member (11, 31);

~~that~~ a first flow path section (51a) is provided radially outwardly of the first body part (41a) between the valve housing (43) and the inner wall (49) of the internal bore (12, 32), and a second flow path section (51b) is provided between the second body part (41b) and said inner wall (49), said first and second flow path sections (51a, 51b) extending essentially in the axial direction of the internal bore (12, 32) on mutually different levels as seen in the radial direction of the internal bore;

~~that~~ the first flow path section (51a) is connected to the second flow path section (51b) via an intermediate flow path section (51e) extending obliquely in relation to the first and second flow path sections (51a, 51b); and

~~that~~ the first body part (41a) is adapted to block the intermediate flow path section (51e) when the valve body (41) is displaced from said second position to said first position.

16. (currently amended) A The hydraulic subsea coupling device according to claim 15 ~~in combination with claim 14, characterized in that~~ 15, wherein the second body part (41b) has a

smaller cross-sectional area than the first body part (41a), that the second body part (41b) is surrounded by the ring-shaped seal element (47) and out of engagement therewith when the valve body is in said second position, that an external surface of the first body part (41a) is adapted to be brought into engagement with the ring-shaped seal element (47) so as to form a fluid-tight seal between the inner wall (49) of the internal bore (12, 32) and the valve body (41) when the valve body is displaced from said second position to said first position, and that the end of the first body part (41a) facing the second body part (41b) only has blunt edges so that the ring-shaped seal element (47) will meet no sharp edge when the valve body (41) is displaced between said positions.

17. (currently amended) A The hydraulic subsea coupling device according to claim 15 or 16, ~~characterized in that~~ 15, wherein the intermediate flow path section (51e) is defined partly by an external surface (50e) of the valve body (41) which extends obliquely, as seen in the axial direction of the valve body (41), between the first body part (41a) and the second body part (41b).

18. (currently amended) A valve device, ~~characterized in~~ comprising:  
~~that it comprises~~ a first valve part (110) provided with a first female sealing member (111) and having an internal bore (112) extending through the valve part (110) and its female sealing member (111),  
a second valve part (130) provided with a second female sealing member (131), and  
a sealing element (20) interposed between the first female sealing member (111) and the second female sealing member, wherein (131); ~~that~~ the sealing element comprises a hollow body

(26) of metallic material with a first male sealing member (21a) formed at a first end of the body (26) and a second male sealing member (21b) formed at a second end of the body (26) opposite said first end, the respective male sealing member (21a, 21b) having an external spherical contact surface (23a, 23b);

~~that~~ wherein an internal bore (22) extends through the body (26) and through the first and second male sealing members (21a, 21b), the spherical contact surface (23a, 23b) of the respective male sealing member (21a, 21b) surrounding said internal bore (22);

~~that~~ wherein the first female sealing member (111) has an internal conical contact surface (113) of metallic material for engagement with the spherical contact surface (23a) of the first male sealing member (21a), the spherical contact surface (23a) of the first male sealing member and the corresponding conical contact surface (113) of the first female sealing member being designed to form a fluid-tight seal between the sealing element (20) and the first valve part (110) when said contact surfaces (23a, 113) are pressed against each other; and

~~that~~ wherein the second female sealing member (131) is provided with an internal conical contact surface (133) of metallic material for engagement with the spherical contact surface (23b) of the second male sealing member (21b), the spherical contact surface (23b) of the second male sealing member and the corresponding conical contact surface (133) of the second female sealing member being designed to form a fluid-tight seal between the sealing element (20) and the second valve part (130) when said contact surfaces (23b, 133) are pressed against each other.

19. (currently amended) A The valve device according to claim 18, ~~characterized in that~~ wherein the first valve part (110) and the second valve part (130) are displaceable in relation to each other in the axial direction of the body (26) of the sealing element (20) between a first



position, in which the contact surface (23a, 23b) of both male sealing members (21a, 21b) is pressed against its corresponding contact surface (113, 133) of the female sealing members (111, 131), and a second position, in which the contact surface (23a, 23b) of at least one of the male sealing members (21a, 21b) is out of engagement with its corresponding contact surface (113, 133) of the female sealing members (111, 131).

20. (currently amended) A The valve device according to claim 19, ~~characterized in that~~ wherein the contact surface (23b) of the second male sealing member (21b) is out of engagement with the corresponding contact surface (133) of the second female sealing member (131), whereas the contact surface (23a) of the first male sealing member (21a) is in engagement with the corresponding contact surface (113) of the first female sealing member (111), when the first and second valve parts (110, 130) are in said second position.

21. (currently amended) A The valve device according to claim 19 ~~or 20, characterized in that~~ 19, wherein the valve device (102) is provided with a flow channel (103), which is connected to the internal bore (112) of the first valve part (110) via the space between the first female sealing member (111) and the second female sealing member (131), and ~~that~~ wherein said flow channel (103) is in fluid communication with the internal bore (112) of the first valve part when the first and second valve parts (110, 130) are in said first position, whereas said flow channel (103) is not in fluid communication with the internal bore (112) of the first valve part when the first and second valve parts (110, 130) are in said second position.

22. (currently amended) A The valve device according to ~~any one of claims 18-21,~~

~~characterized in that~~ claim 18, wherein the valve device (102) constitutes a subsea valve.

23. (currently amended) A The valve device according to ~~any one of claims 18-22,~~  
~~characterized in that~~ claim 18, wherein the first male sealing member (21a) is coaxial with the  
second male sealing member (21b).

24. (currently amended) A The valve device according to ~~any one of claims 18-23,~~  
~~characterized in that~~ claim 18, wherein the body (26) is provided with an intermediate member  
(24), which forms a continuous part together with the first and second male sealing members  
(21a, 21b) and which is mechanically compressible so as to be capable to store elastic energy  
when the body (26) is subjected to axial compression, and ~~that~~ wherein the internal bore (22)  
extends through said intermediate member (24).

25. (currently amended) A The valve device according to claim 24, ~~characterized in that~~  
wherein the intermediate member (24) is expandable by an internal fluid pressure in the body  
(26) so as to urge the respective male sealing member (21a, 21b) outwards in the axial direction  
of the body (26) against the corresponding female sealing member when the sealing element is  
fitted between said female sealing members, thereby increasing the sealing contact pressure  
between the respective male sealing member and the corresponding female sealing member.

26. (currently amended) A The valve device according to claim 25, ~~characterized in that~~  
wherein the intermediate member (24) has an internal cross-sectional area which is larger than  
the external cross-sectional area of the respective male sealing member (21a, 21b) as seen at the

point (P) of the male sealing member where the male sealing member is designed to engage with the corresponding female sealing member.

27. (currently amended) A The valve device according to ~~any one of claims 24-26,~~  
~~characterized in that~~ claim 24, wherein the intermediate member (24) is essentially shaped as a single or multiple wave bellows.

28. (new) The hydraulic coupling device according to claim 1, wherein the hydraulic coupling device comprises a hydraulic subsea coupling device.